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Effect of high temperature water laden environment on flexural properties of hybrid nanoclay GFRE composites

Ahmad Rafiq
Arkaz Al-Sharq Building Materials, Saudi Arabia

This study presents the potential of hybrid Glass Fiber Reinforced Epoxy (GFRE) clay nanocomposites as impact resistant laminated composites in high temperature water laden environment. Electrical Grade-Corrosion Resistant (E-CR) glass fiber mats were used to prepare the hybrid GFRE nanocomposites by employing hand layup and hot pressing techniques. The nanocomposite matrix was synthesized by high shear mixing using one to five wt% loading of I.30E and immersed in water at 23°C and 80°C. A two-step water uptake behavior was observed which showed lowest weight gain for five wt% samples. Addition of nanoclay showed improvement in wateruptake resistance but reduced with subsequent clay addition due to processing difficulties at higher clay loadings as confirmed by SEM analysis. The rate of diffusion for 80°C samples was more than twice that of room temperature samples. The most reduction in flexural strength and modulus was seen for five wt% samples which reached upto 55% and 12%. The combined effect of high temperature and plasticizing effect of water caused significant decrease in flexural properties. Addition of nanoclay showed 16% improvement in flexural strength for 80°C which was the highest for 1.5 wt%.

Biography

Ahmad Rafiq has completed his MS from King Fahd University of Petroleum and Minerals, Saudi Arabia. He has published two papers in reputed journals and presented in a number of international conferences.

ahmadrafiq90@gmail.com

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